



SET of GUIDELINES for the provision of HPC services

to industry and in particular Small and Medium Enterprises
(SMEs).





SESAMENet aims to create an open and inclusive European network of Competence Centers and Organizations joining forces in order to raise SMEs' awareness on HPC and to demonstrate it as a key competitiveness enabler. SESAMENet stimulates its members to share experiences, exchange best practices, learn from each other, identify similarities and differences of high-tech business environments among regions and to gain from synergies.

Objectives

In the framework of the SESAMENet project the practices of the competence centers involved in project, the results of a relative survey and of the best practices workshops were summarized. The collected and documented best practices incorporate success stories not only from the operation of the SESAME Net partners, but also from other projects in the area like PRACE and FORTISSIMO. As a conclusion from all this collected and documented experience, this SET of Guidelines was created in order to help less experienced HPC centers to provide high quality services to industry and in particular SMEs.

Method of collecting input

The input for the best practices applied by the SESAME Net partners came from various sources:

-  Survey among SESAME Net partners
-  Online technical forum
-  Desktop Research
-  Face to face meetings

All best practices were recorded and uploaded to the specific SESAME Net best practice webpage <https://sesamenet.eu/resources/best-practice/>

By synthesizing all collected best practices, success factors and main inhibitors we have reached the following set of guidelines:

SET of GUIDELINES




for the provision of HPC services to industry and in particular SMEs.

-  Conduct high level dissemination efforts
-  What to communicate to SMEs
-  Apply selection criteria
-  Offer a no-fee consultancy period/a no-fee access period
-  Set a Contract and a Service Level Agreement (SLA)
-  If possible, use a Non-Disclosure Agreement (NDA)
-  Offer HPC along with other services
-  Provide training
-  Provide Support/Helpdesk
-  Be flexible
-  Fast Response Time
-  Apply a Technology Agnostic Culture
-  Give advice on access to funding resources
-  Create a multidisciplinary team
-  Identify the real SME demands
-  Join the SESAMENet network

Make sure you apply high level dissemination efforts in order to make your HPC centre known to the adequate audience and thus to catch the right potential users. Traditional means such as leaflets, newsletters, press releases, magazines, participation in exhibitions are always useful. Nevertheless, as the **HPC activity is not yet known by every SME, more intensive, targeted and sometimes personalized methods are required.**

Conduct High Level Dissemination Efforts

Indicatively:

-  **Industry testimonials:** Industrial clients want to hear peers' opinions and impressions. Find a way (e.g. video interviews presenting a successful cooperation with SMEs), so that existing or ex-customers present their experience, the acquired benefits and possible pitfalls (see BP1: the example of ICHEC). To this end, you may also rely on the use cases documented by SESAMENet: <https://sesamenet.eu/resources/success-stories/>
-  **Face to face contacts:** As HPC is a particularly technical issue, it is crucial to engage directly with SME representatives. Face to face contact to create a basis of trust seems to be the most successful method.
-  **Participation in industrial clusters and industry-specific workshops,** so that you can present the HPC services in an industry-specific way and learn about industry-specific needs, or just lobby with potential SME users. Being a national HPC provider doesn't mean that everyone knows about you.

Computer-based simulations have become standard tools for industry and academia. And supercomputers are no longer limited to large academic, governmental and industrial research facilities, but also to smaller entities. Consequently, the potential benefits of HPC for SMEs that you need to communicate are already well known.

What to communicate to SMEs

This experience shows that you should always mention:

Economic reasons: explain how HPC will reduce costs and/or improve benefits. For example, reducing designing and prototyping costs; detecting design errors in early stages of product development. Or, if prototyping plays a major role in the SME's chain value then HPC saves the costs of building many expensive physical prototypes that now can be built virtually.

Innovative reasons: If an SME has an R&D department, the access to HPC resources can improve the possibilities to develop innovative products, with the associated economic benefits, e.g. the first-mover advantage of a new product in the market.

Marketing reasons: HPC usage will give the SME a “cutting-edge technology” image. This will have a positive effect in its market position, through an improved customers' perception of the enterprise, with the subsequent positive economic impact, e.g. more sales, price premiums, and so forth.

Competitive advantage reasons: Technologically capable firms have inherent advantages compared to competition. E.g. the reduced time to market enabled by HPC use, allows a bigger manoeuvrability to adapt to changing modern markets.

🔄 **Successful use-cases**, with which SMEs can identify. You can show the SESAMENet use cases (<https://sesamenet.eu/resources/success-stories/>), grouped per sector (energy, water and environment, life sciences, manufacturing and materials, creative and new industries). But your own real life examples are always better.

🔄 **Access to funding opportunities** (local, national or European): In many countries, SME-HPC adoption is in a very early stage and public funding could generate a serious motivation. PRACE, SHAPE and FORTISSIMO should be mentioned as they present various funding opportunities from time to time. The SESAME Net website is constantly updated with the latest information on funding opportunities.

Restrict the number of SMEs you will work with, focusing first on clients that have a well-understood and defined requirement for HPC and the appropriate innovation spirit. Avoid SMEs with unclear objectives or no experience at all in the use of outsourced ICT services.

Apply Selection Criteria

A no-fee consultancy period before committing to any work is recommended, in order to determine what can be done, and to draw up the project plan, work packages, IP, time-line, budget, etc. The contract should be signed after rounds of negotiations and revisions. One initial step could be that the SME fills in the online survey at the SESAME Net website (<https://sesamenet.eu/survey/index.php/265291/link>).

Offer a no-fee consultancy period/ a no-fee access period

In some cases, a no-fee access period may also be useful, especially at the beginning of a service offer. This way, the SME will have, at no cost, a clear view of the benefits and the way in which a supercomputer functions.

Depending on the level of engagement you want to have with your SME-customers, you may choose to use an overall agreement or SLA (Service Level Agreement). In any case, it is always more professional to work on a contract basis, and to make sure you have a negotiated set of agreements or procedures in written form.

Set a Contract and a Service Level Agreement (SLA)

Contract and SLA templates that have been created in the framework of the SESAME Net project, derive from a synthesis of documents provided by several HPC centers from inside and outside the Consortium. We tried to keep a neutral and general spirit, as the contract articles are always subject to national laws and the expertise of the legal department of each center is needed. Another option is to develop a suite of SLAs dealing with the specific level of access requested. You can use the example of HPCW where three main user access levels were determined: Dedicated, Prepaid or Standard.

A strong recommendation is to give the management of legal issues to legal experts. This will allow the HPC experts not to take care of the legal aspects, and thus will speed up the contractual process.

It is widely accepted that the value of most companies today lays primarily in their confidential and technical information, which come as serious challenge to industry R&D managers and research institutions alike. Intellectual property is defined as “patents, trademarks, service marks, rights (whether registered or unregistered) in any designs, applications for any of the foregoing, trade or business names and copyright”.

If possible, use Non-Disclosure Agreement (NDA)

To address these challenges, a separate one or two-way Non-Disclosure Agreement (NDA) can be very valuable in addition to the SLA contracts. The NDA usually covers a duration between 3–7 years. It is applied at the early stages of the engagement to enable exchange of sensitive information between the partners.

To address these challenges, a separate one or two-way Non-Disclosure

Many innovative SMEs are very sensitive in research privacy. As a result they are very conscious in giving data for processing, modeling or simulations that are going to take place outside of their systems. The answer to this problem is an NDA. As an example, you can consult the ICHEC BP2 fact sheet and video: <https://sesamenet.eu/ndas-trade-secrets/>. Another advantage of offering an NDA even when not really needed, is that the center presents itself as more serious and trustable.

As HPC for SMEs may be relatively new, complicated and non-trivial service, it is a good idea to offer HPC combined with provision of other services like storage, cloud or big data facilities but also code optimization, software development, HPC-applications, etc. This will possibly be the entry point for SMEs to get familiar with the HPC culture.

Offer HPC along with other services

Training courses on HPC and related areas including scientific programming, parallel programming, many-core computing, data analytics and system administration are always helpful for the improvement of the collaboration with an SME. Training will help you establish a high quality communication with the client during the work. Training could be given for free or be subject to an affordable fee. As an introductory level, you can use the SESAMENet “Handbook for

Provide Training

Getting Started". You may also find other training material at the SESAMENet website: <https://sesamenet.eu/resources/training-material/>

Typically, an HPC center provides web-based documentation for the users. However, often this does not prove to be enough. A support helpdesk for any kind of questions and general help may be required. You may deliver technical support via phone line or e-mail (tech-support@...) to **help THE CUSTOMER** accessing and using the system, running jobs and overcoming technical system issues and interfacing with software license servers.

Provide Support/Helpdesk

In order to be more attractive to SMEs, you must be **able to adapt services to real user needs**. To this end, it is very important to understand, what exactly the SME expects, or, if this is too vague, to co-decide together with the SME representative the needs that you agree on covering. Again, intensive meetings with the SME before the establishment of the contract are absolutely required.

Be Flexible

When you work with a company you have to provide a fast response to any request. This means that the right contacts from the center have to be clearly defined (even in the contract), and if they are contacted by the SME they have to provide an answer in business response times.

Fast Response Time

It is important not to place one particular technology ahead of another. Instead, apply a culture of being technology agnostic. This way: you will put the emphasis on the HPC provision and not on commercial solutions, proving to SMEs that you are a real hub for technology and not merely a reseller.

Apply a Technology Agnostic Culture

Maximize availability of funding resources and knowledge on how to apply for them. While big companies have realized the benefits of investing in HPC services, SMEs often need the additional motivation of funding resources for minimizing the cost. PRACE, SHAPE and Fortissimo are currently the initiatives that often give such opportunities.

Give Advice on Access to Funding Resources

Organize a multidisciplinary team of domain experts, software engineers, and accredited project managers. A legal expert is also needed during the establishment of the contract. It is also important that the Center has some staff with profiles from the business area, not only from research, in order to have more commercial oriented relations with companies and to better understand the SMEs.

Create a multidisciplinary Team

HPC centers should be aware that most SMEs are at an early stage of adoption of HPC technology, which often hides their real demand. This hidden demand uncovered using different methods: one is to show best practices from the SME's research field, another is to go through an assessment/consulting process and establish the SME's potential to use HPC. SESAME Net provides a self-assessment tool for exactly this purpose.

Identify the real SME demands

For more in-depth details on these guidelines, or for general advice, it is recommended to join the SESAME Net Network. Fill in an application form and join us:

Join the SESAMENet Network

<https://sesamenet.eu/application-form-membership/>. Welcome!

The main problems were related to **contractual problems**. Some failed cases were caused by inability and delays to formulate agreements (too **complex administrative procedures**). As a consequence this caused late starts to projects and in some cases cancellations of projects. In addition, the **insufficient level of expertise at SME level or training of the SME to use HPC technology** caused failed cases.

Main Inhibitors

Problems related to the HPC service offered to SMEs as identified by the SESAME Net partnering HPC centers

HPC technologies and its derived cloud services have been actively used in universities, institutes and other research facilities for a long period of time. However in the global market, from SME point of view, HPC represents front end, state-of-the-art services. The vast majority of failed cases and problems in taking up HPC services originate from the same source, an overall lack of knowledge related to HPC technologies and services in the SME sector. This represents the challenge that each HPC provider or centre needs to address. The exact problem varies between different HPC providers, mainly depending on the region of each HPC provider (state of the economy, main business sectors, complexity and efficiency of administrative procedures, etc.).

You can find below a categorization of the most common inhibitors met:

Administrative

Responsible side for problem: **HPC CC**

- ❦ Complicated administrative procedures for accessing HPC resource (e.g. contracts made in English between SME and foreign HPC provider)
- ❦ Regulations how to use public infrastructure for business

Responsible side for problem: **SME**

Contractual/legal problems with fulfilling the contractual obligations from SME side

Responsible side for problem: **SME/HPC CC**

Insufficient funding, improper financial planning, underestimated implementation costs

SET of GUIDELINES

Technical

Responsible side for problem: **HPC CC**

- ❖ Problem with ISV license availability, third-party software licensing
- ❖ Experienced staff leave to big vendors/companies (no regulated collaboration with them)
- ❖ Overestimated functionalities, and too short deadlines to realize project

Responsible side for problem: **SME**

- ❖ SME does not have problems applicable/solvable to HPC

Responsible side for problem: **SME/HPC CC**

- ❖ SME's high initial expectation unable to be fulfilled

Expertise

Responsible side for problem: **HPC CC**

- ❖ Problem finding HPC expertise needed for technology transfer and support
- ❖ Lack of human resources (specialists, technical staff, implementers) at HPC centre

Responsible side for problem: **SME**

- ❖ Inexperienced SMEs, poor understanding of HPC technologies, where and how to use HPC services

Communication

Responsible side for problem: **HPC CC**

- ❖ Lack of understanding as to how an SME can engage
- ❖ Lack of experience in promoting HPC services (pricing, subsidized services, etc.) to SMEs

Responsible side for problem: **SME**

- ❖ SME withdrawal from the project/negotiation

Competition

Responsible side for problem: **SME**

- ❖ Confusing pricing scheme from cloud providers (hidden costs)
- ❖ Easy/cheap HPC-like alternative providers (e.g. cloud providers)